

CORNELL RURAL SCHOOL LEAFLET

*Woodlands  
in Spring*

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# CORNELL RURAL SCHOOL LEAFLET

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W. I. MYERS, DEAN OF THE COLLEGE

THE DEPARTMENT OF RURAL EDUCATION  
ANDREW LEON WINSOR, HEAD OF THE DEPARTMENT

PREPARED AND SUPERVISED BY

EVA L. GORDON

ASSOCIATE PROFESSOR OF RURAL EDUCATION

ASSISTED BY DORA E. WORBS,

DOREEN PERELLI, AND RICHARD B. FISCHER

EDITORS FOR THE COLLEGE

WILLIAM B. WARD

NELL B. LEONARD

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New York State College of Agriculture,  
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## Woodlands In Spring

By EVA L. GORDON

**E**VEN while February snows are deep and February winds are cold, don't you begin to look forward to woodlands in the spring? Probably most of you have a favorite spot that you visit each year, even before the first hardy hepaticas show their dainty flowers. There is much to see, and hear, and smell, and touch, and taste (if you are sure you know what to try) in the woods at any time of year, but in the spring there are new things every day.

This Leaflet tells about some of these things, and shows some ways in which you can enjoy a woodland in the spring. You may already know many of the facts the Leaflet tells. You may have tried many of the things it suggests. As something special for you to do, we have pointed out how each of you can help in the *conservation* of woodlands in spring. Conservation is often defined as "the wise use of our natural resources—soil, water,

plants, animals, and minerals—so that they will yield the greatest service to the largest number of persons for the longest possible time."<sup>1</sup>

Woodlands are valuable for many reasons. They supply useful products. They help to control erosion and to conserve water. They break the force of the wind. They feed and shelter game and other living things. Last, but not least, woodlands bring pleasure to many persons who like to picnic or camp or even just walk in a quiet, shady place where wild things live, and there is much to discover and to watch.

Perhaps the woodland you visit each spring is a park. Or, it may be in the country. Wherever it is, you and every visitor can and should help to keep it beautiful and unspoiled, not only this year, but for the years to come. Five words tell you how: *Enjoy, but do not destroy.*

<sup>1</sup> Cornell 4-H Club Bulletin 77, page 3.

## Woodlands Differ

WOODLANDS are different, first, because different kinds of trees grow in them. In some, called *deciduous* woods, the trees regularly drop their leaves in the fall. Some are *coniferous* woods (made up of "evergreen" trees that bear cones). Others are mixed woods, in which both coniferous and deciduous trees grow. Which kinds do you visit?

In most woodlands, you find among the trees some kinds of vines and shrubs and many kinds of smaller forest-floor plants. All woodlands, too, have a population of animals that find food, shelter, protection, and often homes within their borders. What you find and where you find them vary with the kind of woodland.

In coniferous woods, the trees usually grow close together so that their needle-covered branches shut out sunlight all the year

around. Few plants grow beneath the trees. Most of the animals, big and little, live along the borders or in openings.

In some deciduous or mixed woodlands, the trees crowd together until their leafy tops form so dense a tent or *canopy* that little sunlight reaches the forest floor in summer. Shrubs and trees that cannot stand shade grow only along roads, streams, and woodland edges, or in burned or cut-over areas where there is more light. On the forest floor, you find chiefly plants that bloom early and often go to seed before the leaves on the trees are full grown. Here, too, more of the smaller plants and more of the animals live near borders or openings than in the interior.

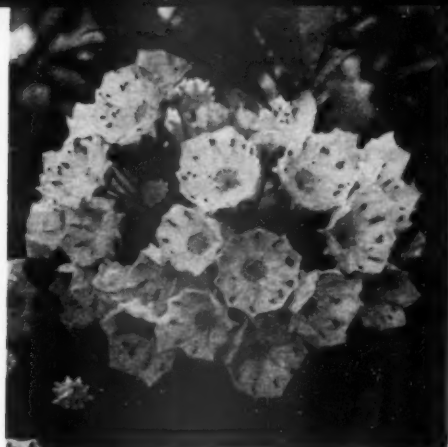
Other mixed or deciduous woodlands are open and parklike. The trees grow far enough apart so that sunlight can reach the for-

*Trailing Arbutus* (left) blossoms in early spring; *Partridge-berry* (right) in June or July

× about ¼

Photos by R. B. Fischer





x about 1/2



Photos by L. W. Brownell

*Mountain Laurel (left) is protected on New York State lands; Pinxter-flower, or Pink Azalea, (right) also should be conserved*

est floor in many places. Shrubs which could not grow in dense-canopied woodlands flourish. Some plants on the woodland floor bloom and ripen their seeds early, but others blossom throughout the summer.

The kinds of trees may vary from woodland to woodland. Some kinds are common along streams and in wet places. Others grow in higher or drier places. The kinds of woody plants on the two banks of a stream or valley may differ if one side faces north and the other faces south. The

steeper the slope the greater is the difference in the kinds of plants.

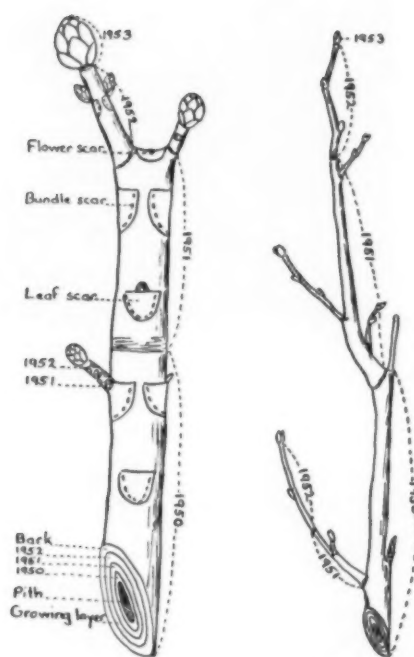
A woodland need not be large to be worth studying. As Professor Palmer pointed out in *Wooded Laboratories*, the 1951 Spring Leaflet, you can learn much by watching a single tree or shrub. In fact, if you watch the spring-time changes in one or more of the trees or shrubs on your school ground, along the streets, or in your home lawn, you will see many of the things discussed in this Leaflet.

## Trees in Spring

**F**LOWING sap may be the first woodland sign that winter is passing and spring is really coming. Small sap icicles may hang from broken twigs, or sap from a woodpecker's feeding-hole may wet a tree trunk. When sap-buck-

ets hang on newly-tapped sugar maples, you can be sure that sap is running. It is time for an early visit to your favorite woodland. Choose a day when most of the winter's snow has melted from the forest floor.





Drawings by Doreen Perelli

Twigs of Horse Chestnut (left) and Basswood (right), with parts named

## At Winter's End

### Old leaves

On the ground are leaves of past years. Most of those on top fell last fall and are well preserved. You can easily recognize those you know. How many kinds, known and unknown, can you find? Some probably are from vines or shrubs as well as from trees. Can you see that some have decayed more than others? Leaves of oaks, for example, resist decay; those of two past seasons may remain unrotted. Other leaves, such as those of elms, may go to

pieces by the end of the first winter. Only the veins of some leaves, such as maples and cottonwoods, may remain. Look for a perfect specimen of one of these *skeletonized* leaves. Needles of evergreens decay most slowly.

As you dig down through the leafy layer you will probably find twigs and pieces of bark and branches. You will come to unrecognizable bits of these materials, and then to the moist, dark-colored *humus*, formed in part from the decay of still older materials. You will have seen how some useful plant materials are returned to the soil of woodlands. Do you understand, too, a little of how woodlands help to conserve water?

Above your head, you may see trees that still hold last year's dead, useless leaves. Such trees are likely to be oaks or beeches, but sometimes sugar maples and other trees keep some leaves.

### Bark

Have you noticed differences in the bark of different kinds of trees? The white, papery bark of birch, the blotchy bark of sycamore, and the smooth gray bark of beech stand out clearly in a woodland. You will find it harder to see differences in some other kinds of bark.

### Winter twigs

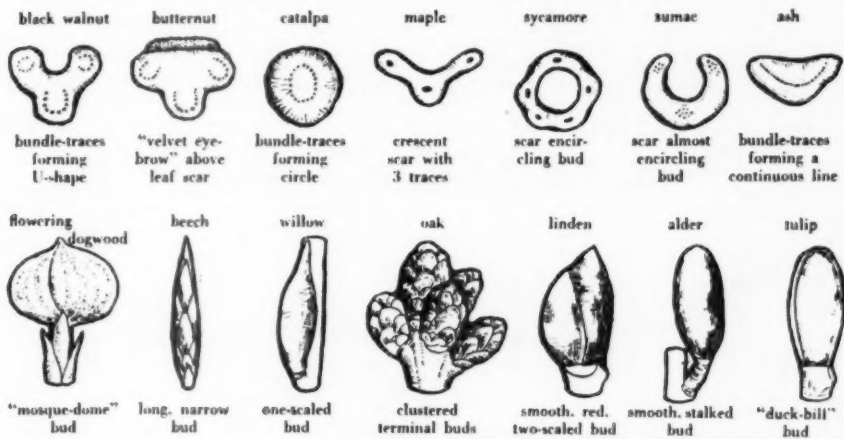
The winter twigs of trees,

shrubs, and vines might be called their fingerprints—at any rate, their differences will help you to identify them accurately. We will not try to tell you in this Leaflet how to be a tree-detective—it is too big a job. But you *can* look at winter twigs and find differences in color, in size, in arrangement of their buds and leaf scars (opposite, as in maples, or alternate as in elms), in smoothness, and even in odor and taste. The buds they bear and the scars left by leaves of past years are some of the best clues.

You might make a small collection of different kinds of twigs so that you can study these differences and perhaps see others. The illustrations on this page will help. As you collect, look for twigs with buds of different sizes. Some kinds of woody plants have

winter buds that differ in shape as well as in size. A winter bud, you know, contains either (1) next summer's leaves and the twig on which they will grow, all almost unbelievably small; (2) the tiny beginnings of flowers and the twig on which they will grow; or (3) both leaves and flowers and their twig-to-be. Usually the larger buds contain flowers or are end-of-the-twig buds. Your textbooks, encyclopedias, and other reference books tell more about these buds. Remember, they grew last summer, each either at the tip of a twig or in the angle between a leafstalk and the twig to which it was attached. In winter, most buds show just above the scar where a leaf fell off in autumn.

You can be a true conservationist if you follow these directions



*Drawings from Morton Arboretum, Lisle, Illinois*

*Some leaf scars (above) and winter buds (below)  
Differences in leaf scars and buds help to identify woody plants in winter*

when you go collecting: (1) Have permission to take the specimens you need. (2) Take side branches, not the ends of main branches so you will not spoil the natural shape of the plant. (3) When you can, use branches freshly broken off by wind, if they were alive, or pieces removed when trees, shrubs, or vines are pruned. (4) Use pruning shears or a sharp knife—never break off branches. (5) Take only what you need.

If you keep your specimens in water while you study their differences, you can use your collection to observe some of the spring changes discussed on pages 8 to 14. Don't let your twigs dry out before you put them in water, and keep them in a light, warm place.

#### **Fruits and seeds**

How many kinds can you find? Look on plants and on the woodland floor. Leave most of them where you find them. It will be

more interesting to watch what happens to them than to have them in a collection. Some will be (or have been) eaten by animals. Some will begin to grow when it is time.

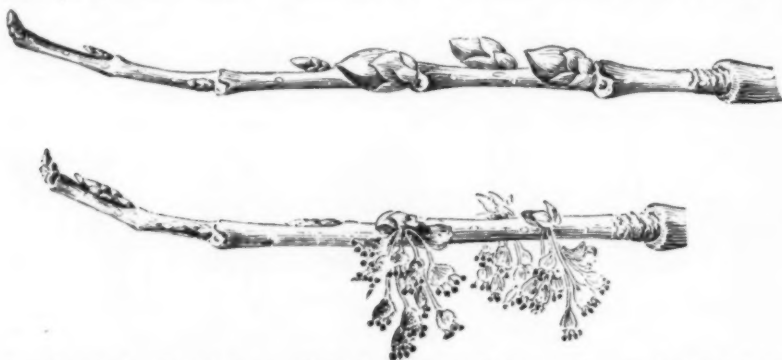
#### **Spring Changes**

Most of the things about trees discussed on pages 5 to 8 might be called "hold-overs" from past years: old leaves; old bark; winter twigs just as they were the past fall; buds that had grown during the past summer; and fruits and seeds, most of which had ripened months before. But new growth begins early.

#### **Swelling buds**

Often by the end of February, in much of New York State, buds on American elms and some other kinds of woody plants have begun to swell. From then on, you have much to watch.

First, what happens to the *bud scales* that form the outside of



*An elm twig showing small leaf buds and larger flower buds (above); below: elm blossoms*



most of those winter buds? As you studied your collection of twigs or examined woody plants, you surely discovered that winter buds have different numbers of bud scales. Willows and sycamores have one. Elm, beech, and sugar maple have many more. A few woody plants have *naked* buds, with no scales at all. Poison ivy, hobblebush, and witch-hazel are examples.

Probably you have noticed how the one scale on a pussy-willow splits open and finally falls off. Elm scales, too, loosen and drop soon after the buds open. Pear scales grow longer as the buds swell. The new growth shows white at the base of the scales. When a shagbark hickory bud expands, some of the scales fall away, but the inner ones enlarge to 2 or 3 or more inches in length. They remain on the tree until the young leaves are partly grown, looking much like yellowish green or reddish flower petals,

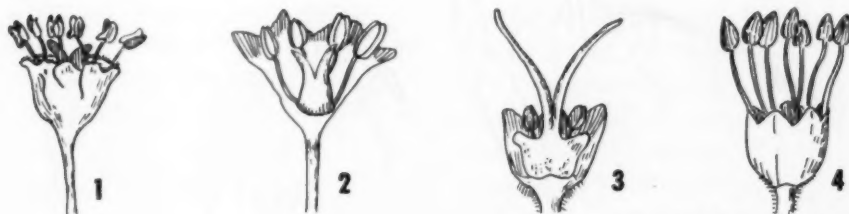


Photo by Brina Kessel

*The showy bracts of Flowering Dogwood were winter bud scales*

downy on the outside and smooth on the inside.

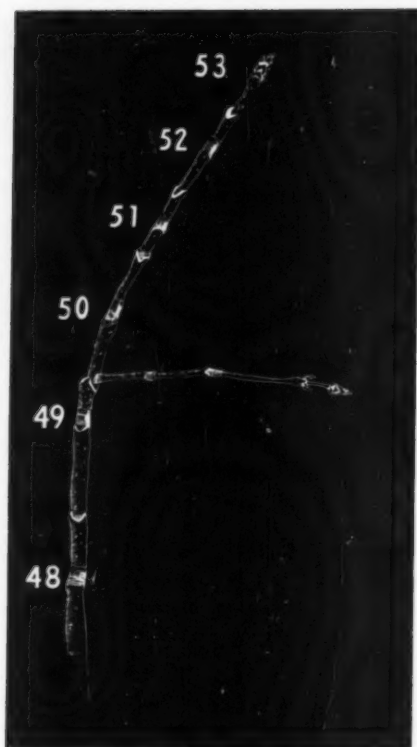
The gray, "shoe-button" flower buds of flowering dogwood have four scales. When the buds begin to swell, these scales separate and begin to grow from their bases. They become the creamy-white *bracts*, often wrongly called petals, that surround the cluster of small, inconspicuous true flowers. The purplish notch in the tip of each showy white banner—*bract* is its best name—is a reminder of the scale from which it came.



Drawing by Doreen Perelli

#### *Types of Flowers*

1. Perfect flower of American Elm; 2. perfect flower of Cork Elm, cut to show stamens and pistil; 3. pistillate flower of Sugar Maple (the short stamens do not mature); 4. staminate flower of Sugar Maple



*Drawing by Katherine Wolf*

*Sugar Maple branchlet showing years' growth from 1948 through 1953*

Flowering dogwood leaf buds are smaller. Their two scales meet at

the edges, open like a stork's bill, and as they grow, out comes a "tongue" of rolled-up leaves.

What have you discovered? Have you noticed that bud scales differ in color, as well as in number? that they fit together in different ways? that some are smooth, some are hairy, and some are sticky? that different things happen as the buds grow?

Have you wondered what good these bud coverings were? They *do not* protect the tender parts inside from freezing. They *do* prevent these soft growing parts from drying out. They protect them from injury, and perhaps to some extent from the effect of sudden temperature changes.

One thing more! When the bud scales fell off, did they leave scars? And do those scars, because they are close together, make a ring where the new growth began? Such rings of bud-scale scars help you to know how old branches are and how much they



*Drawing by Doreen Perelli*

*1. Shadbush. 2. Tulip Tree. 3. Sugar Maple. 4. Sycamore*  
These young leaves still show how they were packed in the winter buds



*Photos by R. W. Curtis*

*Left, flowers of Sugar Maple; right, pollen-bearing catkins (left) and pistillate catkins (right) of Pussy Willow*

grew in different years. You can easily find them on many kinds of trees. Sugar maples show them clearly. How many years' growth can you count? How long is the longest? the shortest? Look for these scars on cone-bearing trees. Can you tell how many years the needles remain on the tree before they die and fall off? It is two to three years on white pines, but different in other coniferous trees.

#### **Flowers of woody plants**

Woodlands in spring often are crowded underfoot with blossoms of many kinds. Probably even more flowers bloom in the tree

tops overhead. Every kind of tree (and shrub and vine) in New York State has some kind of flower when it is old enough, unless it is a cone-bearer and has cones instead.

Flowers of woody plants may puzzle you because there are so many different shapes, sizes, and colors. Many are small and hard to study. On some trees the flowers are all alike. Other trees have two kinds, often quite different in appearance. Many are beautiful, and well worth looking for. See how many different kinds you can find and how they change as the days go by.

You may want to read in science books or encyclopedias about flowers and their parts and how seeds are produced. The picture on page 9 will help you to understand the following kinds of woody plant flowers.

1. *Perfect flowers.* These have stamens in which pollen is produced; and pistils that contain ovules, the tiny bits of matter that join with pollen to become seeds.

2. *Staminate flowers.* These produce pollen, but have no ovules. Seeds never develop in them.

3. *Pistillate or ovulate flowers.* These lack pollen, but have

ovules from which seeds can develop.

Staminate flowers and the stamens of perfect flowers usually fall off when they have shed their pollen. Fruits with seeds may develop from pistillate flowers, and seeds in ovulate cones. That is, they may if pollen from plants of their own kind has fertilized their ovules.

Insects and wind are important carriers of pollen. Often you can tell by looking or listening which is doing the work. You will see what we mean if you touch a flowering branch of pine ready to shed its pollen; or if you listen to the hum of bees in a blossoming red maple tree. Showy, sweet-scented flowers usually are pollinated by insects. Many, but not all, of the small, inconspicuous ones are wind-pollinated.

#### Fruits, seeds, and seedlings

When the flowers fade, watch the fruits develop. Poplars open their ripe seed-cases in May or early June, and the small seeds in their downy covering float away. Elm fruits shower down from the trees before the leaves are fully grown, and soon green, mosslike patches of elm seedlings appear. Red maple keys ripen in late spring, and young red maples spring up astonishingly soon.

Other fruits mature more slowly. Some will be ripe by fall.



*Blossoms of White Oak*  
s, staminate flowers; p, pistillate flowers



*Photos by Brina Kessel*

### *Red Pine in Spring*

*Ovulate (seed-producing) cones (left, at top); staminate cones (right)*

Others may require as much as three years. Some of the "hold-over" seeds you discovered on earlier visits will be germinating, too. Look for acorns, with their long taproots; for basswood and beech seedlings with their odd-shaped seed leaves; and for little pines or hemlocks.

#### **New leaves**

New leaves, just emerging from winter buds, are fascinating things. They are usually bent, folded or rolled; sometimes their edges are curled inward. Often they are downy, and sometimes delicately tinted. If you made a winter twig collection and kept it

in water as we suggested on page 7, you already know about some young leaves. Did sycamores, creased lengthwise and with a folded-down flap on each side make you, too, think of a drop-leaf table? Did you admire the soft pink and pale green of young white oak leaves, with their covering of fine, silvery hairs? Did you discover that beech leaves are silky-coated and plaited fan-like?

Here are some more questions to answer. Answer them outdoors, so that you will know how things happen naturally.

How many leaves come out of a single bud? Is the number the





*Drawing by Doreen Perelli*

*Seedlings of some common trees  
How many can you name? (See  
page 29.)*

same for all buds on a branch? Up to 5 pairs of leaves may come from the tip bud of an ash. Is the number different for different kinds of trees? Often buds fail to grow; can you find some?

Choose a special tree to watch. At what date do young leaves appear? What color are they? How fast do they grow? Measure a particular leaf from day to day and keep a record. Does weather make a difference? Does the leaf grow faster as it grows older? Do leaves appear before, after, or with the flowers? When do you see the first sign of insect work on young leaves? How soon do next year's buds show?

Don't forget to watch the growth of new evergreen leaves. Most are pale green and soft when they are young. The bundles of young white pine needles have a pin-feathery look at first because they are enclosed in a sheath that falls off as they grow.

Have you made a big discovery about deciduous trees? *All* the leaves are on the new growth. All of them came from newly "unpacked" buds. Trees grow that way: from the tips of their branches and from the tips of their roots; but they put on, also, a new layer of growth over the entire tree. Those layers you can see in a tree stump, or where a branch has been cut across.



× 1/2

Photo by R. B. Fischer

*Hepatica*



× 1 1/2

Photo by Verne Morton

*Spring Beauty*

## Plants Under the Trees

WITH the first warm days of spring, woodlands fairly burst into bloom. Almost overnight, it seems, the woods are carpeted with flowers. What fun it is to see them all, and perhaps to pick one here and there. But what a responsibility—to know which ones to take (if any), how many, and how and where to gather them. Probably no one really *wants* to harm a woodland or to spoil it for others, but many persons, young and old, are poor conservationists when they visit woodlands in spring.

One step toward becoming a good conservationist is to learn all you can about the resource

you wish to conserve. Take woodland plants as an example. Knowing how they grow and what they need to keep them growing helps you to make your own conservation rules. As you learn new things about the plants you study, you will find it more and more satisfying to “enjoy, but not destroy.” And it will be much better for the parks and woodlands and other places where wild flowers grow than if you rush about trampling down plants while you pick great bunches of flowers that often wilt before you can get them home; or break off branches of flowering trees and shrubs and leave ugly stubs for the next vis-

itor to see; or do other thoughtless or harmful things.

### Spring Flowers and How They Grow

Most of the smaller spring-flowering plants of woodlands live through several or even many years, just as trees do. We call such plants *perennials*. You have learned that the spring growth of trees (and shrubs and woody vines), really began the summer before. Then, buds for the next spring's leaves, flowers, and new twigs were formed. At the same time the leaves were making food. Some was stored, and is used as new growth begins.

The same things are true of the smaller perennial plants of woodlands. Most of them die down to the ground each summer or fall. A few keep old leaves through the winter. But, before they die down, they have made and stored food in their underground parts, and have formed buds (usually below ground) for their next season's growth. Like the trees, they, too, are able to burst into bloom and new growth when spring comes. Most of them make almost their whole year's growth in the few weeks before the tree leaves above shut off the light they need. They seem ready to be shaded when the shade comes. Perhaps they even need it. At any rate, some kinds quickly die out when

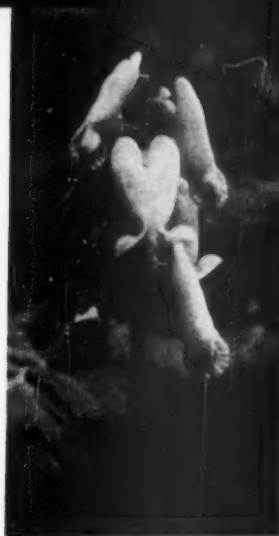
the trees are cut or the woods are otherwise destroyed.

You can see how important it is for us to think now about next year's flowers. What we do *now* will make a difference in how many of this year's flowers set seeds to start new plants; and in how many of this year's plants will be able to grow in their natural way and blossom again next spring. A few examples will help you to understand.

Two of the very earliest spring flowers are *hepaticas* and *spring beauties*. Around Ithaca, hepaticas often are in bloom by March 25, and spring beauties bloom with them or only a little later.

When the hepaticas lift their pink, white, or bluish-purple flowers on their fuzzy, 3-inch stalks, you can find last year's purple-brown, 3-lobed leaves spread around them on the ground. During the winter, if you had looked, you could have found, at the center of the leaf cluster, the plump, pointed bud from which this spring's flowers came. A few days after the flowers open, new, fuzzy, pale-green leaves appear. These remain through summer, fall, and winter. Next year's flowers will come from a pointed bud formed at *their* bases.

Now, what would a good conservationist do about hepaticas?



*Squirrel Corn*  
× 2



*Dutchman's Breeches*  
× 1/2



*Yellow Adder's-tongue*  
× 1/3

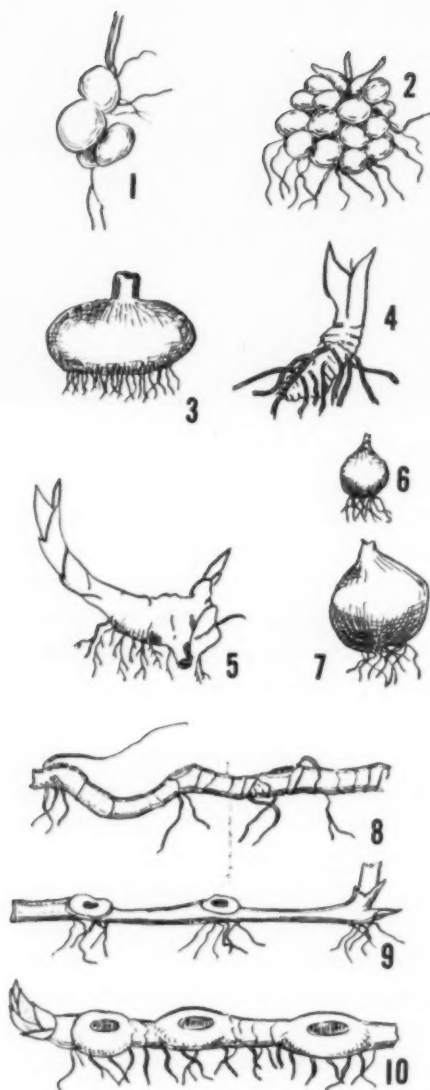
Photos by John New (left, center) and Verne Morton (right)

Usually each plant has several flowers. You can pick them separately, *without picking the leaves*. The new leaves will be left to make food to be stored so the plant can bloom again next year. If you leave part of a plant's flowers to set seed, you can pick a few and still be a good conservationist.

A spring-beauty plant has several blossoms, too. But the dainty, pinkish, pink-veined flowers grow in a cluster, all on a single stem. The two leaves (narrow in one kind of spring beauty, and broader in another) grow on the same stem. Usually one picks *all* the flowers and *all* the leaves on a plant when he plucks a spring beauty. No seeds can come from that plant. With the leaves gone, not enough food can be made and stored in the small, white tuber below ground at the base

of the stem, to have it ready to send up new leaves and flowers next spring, nor probably any future spring. So, a good conservationist looks to see how many spring beauty plants grow nearby. If there are many, some can be picked without harm. New plants from seeds and from new tubers formed by the remaining plants probably will fill the empty places. Indians used to dig the tubers and use them for food, but the beauty of the flowers is more important to us than the food value.

The trilliums, yellow adder's-tongue, Dutchman's breeches and squirrel corn, wild ginger, blood-root, jack-in-the-pulpit, May-apple, all the violets, and many other woodland flowering plants grow as the spring beauty does: from underground parts that contain stored-up plant food. These



#### Underground Parts

1. Squirrel Corn; 2. Dutchman's Breeches; 3. Jack-in-the-pulpit; 4. Trillium; 5. Bloodroot; 6. Spring Beauty; 7. Yellow Adder's-tongue; 8. False Solomon's Seal; 9. Mandrake; 10. Solomon's Seal

parts differ, but all the plants use stored food during their growing period. New food must be made by the leaves to build up the underground parts for next year's blossoming. To insure new plants, some flowers must "go to seed." In general, *where the plants are abundant*, you may pick a few flowers if you are careful to remember these two needs: seeds and stored food. With some of these plants, however, there are other things to be considered.

Trilliums, especially the large-flowered white trillium, are conspicuous, attractive flowers. Often too many are picked. Each trillium plant bears its one flower and its three leaves near the tip of a long stem. If you pick one, leaves and all, that plant can set no seeds. Neither can it restock its underground rootstock; there will be no plant to flower next year. Seeds from other trilliums will have an empty spot to fill. In the wild, we are told, trillium seeds need a period of cold for two years in succession in order to germinate. Then the seedlings need still more time to grow old enough to bloom. Think how long it would take seeds to replace the trilliums one person might destroy in one afternoon! Besides, trilliums in a vase are not nearly so beautiful as trilliums growing in a woods. Some-





X 1/3

*Jack-in-the-pulpit*



*Pink Lady's-slipper*



*White Trillium*

one put it this way: "A wood, white with trilliums, is such a beautiful sight, no one should ever gather them. . . . Left undisturbed, they bloom year after year, spreading in ever larger patches."

Five kinds of trilliums grow in New York State: two white-flowered kinds, a white one with rosy-purple markings at the base of the petals (the painted trillium), and two with dark red petals. In most of the State, everybody needs to help the trilliums we have left, of whatever kind, bloom "in ever larger patches."

Yellow adder's-tongue also grows slowly. Someone who studied these plants discovered that they required from seven to nine years to grow from seed to flowering age. They have another way

to spread, however. Each plant comes from an underground part called a *corm*. New corms grow below ground from the larger, older ones. Did you ever test your patience by trying to dig down to the onion-shaped corm of an adder's-tongue?

Violets are well loved spring flowers. Nearly every woodland visitor has found pleasure in the blue ones, the yellow ones, and the small white or creamy ones. New York State has many different kinds of violets. Some live in woodlands, others in meadows, and still others in damp, marshy places. Some are sweet-scented, some are not. Do you know how many kinds grow near your home?

Most kinds of violets can be picked freely, at least the com-

mon kinds that have the familiar, dark green, heart-shaped leaves, and whose leaves and flowers grow from the rootstock, each on its own stalk. Most violets, you see, have underground rootstocks. These differ in size and shape, but they grow and branch. New plants often appear at the tips of the branches. The showy, beautiful flowers usually set seed, in 3-parted seed pods, the lobes of which snap open and thus scatter the seeds. But, most important, perhaps, most kinds of violets have at their base small, inconspicuous flowers that never open. These flowers have no petals, but they produce abundant seed from the pollen (in stamens) and ovules (in a pistil) developed within them. Look for them after the showy flowers have gone, even as late as midsummer.

Some kinds of woodland flowers produce only a few seeds. You can learn for yourselves which ones belong in this class by watching the fruits form, ripen, and scatter their seeds.

Knowing which plants grow slowly, which produce few seeds, and which have many seeds, would help you decide how many and what kinds of flowers you could safely pick. Knowing about ways in which some kinds of plants spread would help, too. Don't forget that to spread, plants

need leaves to make food.

Among the flowers that bloom after the early hepaticas and spring beauties are gone are some that should never be picked: the beautiful lady's-slippers or moccasin flowers and their relatives. These flowers are particular about the kinds of places in which they grow, and such places are not common. Careless picking has made the plants rare. The only way to keep them growing is to leave them undisturbed, in places where they can grow. The lady's-slippers or moccasin flowers are protected by law on New York State public lands. They should be protected wherever they grow. This is true of some other New York State plants.

When you have learned what kinds of flowers can be safely picked, and where you are permitted to pick them, perhaps you should stop to think why you pick flowers. Is it just to have something to do in the woods? Or to have something to carry for a time and then drop? Some persons must pick woodland flowers for such reasons. Otherwise we would not find discarded bouquets of wilted flowers along paths in parks, or in parking places, or along country roadsides.

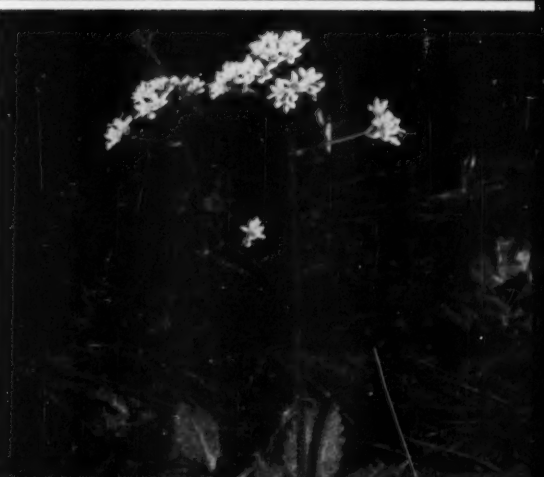
If you pick flowers to take home or to school to study or

just to enjoy, you should learn which ones make good bouquets and how to keep your flowers until you get home. Many woodland flowers wilt quickly or close after they are picked. Bloodroots lose their petals almost at once. They are much more interesting to watch than to pick. Have you noticed how bloodroot comes up, with the flower bud tightly wrapped in the one big, heavily-veined, silvery-green leaf? Have you seen how the flower rises above its leaf when it is in bloom? how the leaf folds around the ripening seed-pod? how much bigger the leaf (food factory) grows before it dies down? Did you know that Indians used the orange-red juice for war paint and dye?

You know that most woodland flowers wilt quickly when you carry them in your warm hands. When botanists collect plants to study, they usually put their specimens into a tight, metal collecting-can called a *vasculum*, lined with damp paper. They keep their vasculums out of the hot sun as much as they can, and often put vasculum, collection, and all in a refrigerator until

*From top to bottom: Fringed Polygala; Rue Anemone; Pepper-root; Early Saxifrage*

*Photos by Brina Kessel (top) and R. B. Fischer  
× about 1/4*



they can study their plants or press them to keep.

You can substitute for the vasculum a shoe-box lined with waxed paper, a big plastic bag, or perhaps a large can with a tight cover. Put in some damp paper. Cut your flowers carefully, and keep your collection as cool as you can. Be sure not to pick any flower that is scarce; and not to pick *anything* unless you are sure you are permitted to do so.

At home or at school, put your flowers at once into fresh, cool water. If they are wilted, cut off a bit of the stem-end first. When they look crisp and fresh, arrange them in a vase or bowl. You will find that a few flowers, well arranged, usually are more attractive than a crowded bouquet. For study, separate containers for each kind of plant are best.

### More to See and to Learn

We have not told you many interesting things about woodland plants: which are good for food; which have flavors and odors you can learn to know; which have been, or still are, used as medicines or in other ways; and special ways in which some grow, or attract pollinating insects, or scatter their seeds.

We have not even mentioned many kinds of woodland flowering plants. Four of these are

pictured on page 21, but there are ever so many more. From March or April to September or even later, there is a procession of flowers to study and to enjoy. Some grow in one kind of place; some prefer another *habitat* (natural living place). Some are abundant in one part of the State, but not in another. Wherever you live you can try some of the suggestions in the following section, can plan other things to do or to discover, and can do your own thinking about how to enjoy but not destroy the woodlands you visit.

### Some Things to Do or Discover

1. How many different kinds of flowers grow singly, as do bloodroot, adder's-tongue, and the trilliums? How many grow in clusters or groups, as spring beauty and hepatica do?

2. Many woodland flowering plants push up from the ground looking like pointed pegs. These "pegs" are sheaths within which leaves, stems, and flowers are tightly rolled. Look for some—they vary in thickness. Watch some unroll. How many kinds of plants can you find that come up this way? Jack-in-the-pulpit is one.

3. How many kinds of plants grow in patches, as adder's-tongue and May-apple do?



× ½

*Wild Ginger*



Photos by J. A. Gustafson (left) and John New (right)

*Bloodroot*

4. Observe the "designs" of leaves: the smooth-edged, 3-lobed leaves of hepatica; the scalloped leaves of bloodroot; the lacy ones of Dutchman's breeches; the rounded, beautifully veined ones of wild ginger; and others you will want to add.

5. Watch how long leaves remain after the flowers are gone. Those of adder's-tongue and Dutchman's breeches are gone by midsummer. Columbine leaves last until fall. Hepatica leaves remain green all winter.

6. How many kinds of white flowers can you list (or draw if you do not know their names)? red flowers? yellow? blue? other colors? How many kinds of plants have flowers of more than one color, as do hepaticas? The large-flowered white trillium becomes

pink as it fades. Do others change color as they grow old?

7. Watch some kind of flower from day to day. How many days is it from the opening of the flower until it withers? Do the flowers close at night or in cloudy or stormy weather? Hepaticas do until they are old; then they remain open.

8. Watch for fruits to ripen and seeds to be shed. You will see much that is interesting and beautiful.

9. Watch insect visitors to spring wildflowers. Most are seekers of food (nectar and pollen), but they help to carry pollen to where it can join with ovules to produce seed.

10. As you learn the names of flowers, make a flower calendar. Record the name of the flower,



the date, the place you found it, and, if you like, its last appearance. If you keep a calendar year after year, you will be surprised to find how regularly the flowers appear at almost the same time each year.

### Flowerless Plants

Do you visit a woodland where moss carpets low banks, covers logs or stones, or makes a green background for some low-growing flowering plant?

More than a thousand kinds of mosses grow in North America. A dozen or so may be found in even a small woodland. Many are at their best in early spring. How many kinds can you find? Some form round, green-white cushions; some look like tiny, trailing

vines; some are fern-like; one, called *tree moss*, looks much like a miniature pine tree. Notice how many little close-set plants are in one small clump of moss.

Like the hepaticas and most other flowering plants, the green parts of mosses manufacture food. Unlike the hepaticas and the others, mosses have no flowers, and do not produce true seeds.

Instead, a moss plant begins its life as a powder-fine bit called a *spore*. Spores of mosses are produced in a capsule, usually borne at the top of a thin, thready stalk that reaches up above the green part of the moss. You can see some of the stalks and capsules in the picture on this page. Look at the mosses you find. How many have capsules on stalks? Notice that the capsules differ in size and shape.

Probably most of us think first how soft and beautiful mosses are. They are good conservers, too; they help to hold moisture and to keep soil from washing away.

Ferns are flowerless plants, too, and grow from spores. They also are perennial plants—they grow from year to year. Many die down to the ground in the fall; some remain green through the winter. Did you find any evergreen ferns on your first woodland visit? If you did, watch for new fronds



Photo by R. B. Fischer

*A moss showing spore capsules*

(leafy parts) to appear on those plants. They come up tightly coiled, from underground parts stored with food. They unroll as they grow.

In most woodlands you will find several kinds of ferns. Watch for the tight coils, often called *fiddleheads*, or *croisiers*. Some are hairy when they first appear, but later lose their downy covering. What other differences do you discover?

When the new fronds are well grown, ferns usually begin to produce a new crop of spores. Some kinds, such as Christmas fern, develop spores in small dot-like cases on the undersides of the green fronds. In other kinds (sensitive fern is an example) the fruit-dots, called *sori* (singular, *sorus*) are borne on special fronds that do not look leaf-like. A few produce spores in still other places.

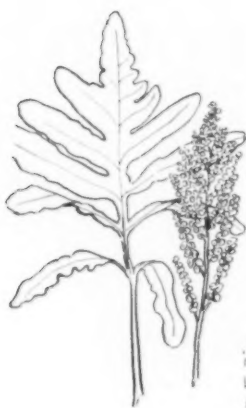
Closely related to the ferns are the club-mosses. Several kinds grow in New York State. Three are illustrated on page 27. On some of the plants you find you may see the "clubs" which bear the spores. They may make you think of dull yellow candles, above the green leaves. A tap from your finger may send off a cloud of dust-like spores. The small, often trailing, evergreen plants, unfortunately have been



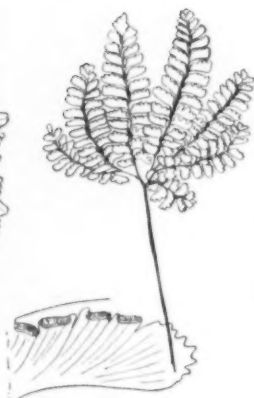
Photo by Verne Morton

*Fiddleheads of Christmas Fern*

too much used for Christmas wreaths and other decorations. They grow slowly. One kind is known to require at least 12 years to grow from a spore to a green, above-ground plant. Here is another opportunity for you to be a good conservationist.



*Sensitive Fern*  
Special spore-bearing frond (right)



*Maidenhair Fern*  
Sori are on incurved edges of frond



*Spiny-toothed Shield Fern*  
Sori are on back of frond

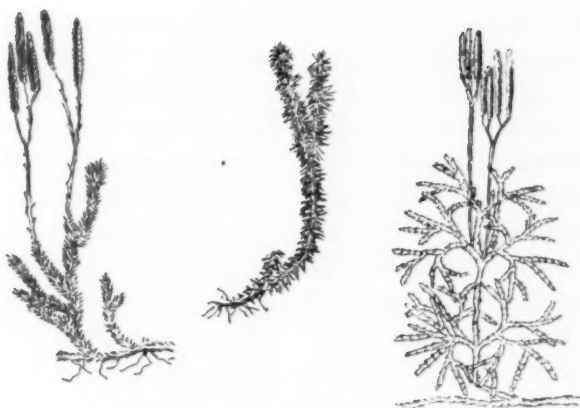
These three—mosses, ferns, and club-mosses—are the green flowerless plants you are most likely to find. There are a few others, among them horsetails, and liverworts. Plants that puzzle you may belong to these groups.

Some day when you are just “poking around,” looking for little things, you may find gray or gray-green flowerless plants called *lichens* (pronounced “likens”). One small kind that grows on rotting wood or on the ground in woods is often topped in spring with bright red knobs. Children call them *British soldiers*. Another kind, called *pyxie-cups* or *fairy goblets*, looks exactly like its name. Others make circular patches on tree trunks or rocks. One kind is called *reindeer moss*, and there are many others. They are worth looking up in your

reference books.

If you “poke around” early enough (in March, around Ithaca), you may find the beautiful scarlet-cup fungus, a cup often an inch or more across, bright red inside, and soft tan on the outside. It grows on rotting sticks on the ground in damp woods.

Hundreds of other fungi grow in woodlands: the shelves or brackets, the puff-balls, the mushrooms or toadstools, and many other kinds, some too small to be seen. Fungi, you probably know, do not make their own food as green plants do. They are dependent plants that get their food from living or dead plants or animals. Some are enemies of woodlands. Some are poisonous. Most are beneficial. You can learn more about them from your science textbooks or encyclopedias.

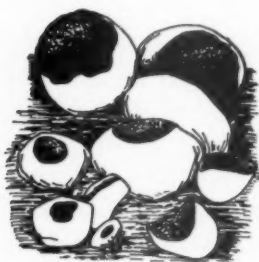


*Three Kinds of Club Moss or Lycopodium*

## Conserve Wild Plants

**W**HEN the first settlers came from Europe to make their homes in America, the greater part of what is now New York State was covered with forests. Now, much of the land has been cleared for farms, homes, cities, highways, airfields, and other uses. There are still millions of acres of forestland in the State, but much of it is far from cities and areas where many persons live.

Probably most readers of this Leaflet, however, have a nearby place to see wild flowers bloom in the spring, ferns push up their fiddleheads, and woodland animals live their daily lives. Some of these places may be city, village, county, or state parks or forests, or other publicly owned lands. Some may be botanical gardens, or wildlife preserves, or sanctuaries; some may be private lands. It is a privilege to have



*Scarlet Cup Fungus*



*Brown-fruited Cladonia, a Lichen*



*Scarlet-crested Cladonia, British Soldiers*

such places to enjoy; and a duty to see that your visits leave them unharmed.

No one can do more to preserve woodland plants than visitors to woodlands. Here are some suggestions.

1. Know what kinds of flowers should not be picked in your area. The New York State Conservation laws list trailing arbutus, lotus, flowering dogwood, mountain laurel, pink lady's-slipper and other moccasin flowers, and two kinds of gentians. This list is a good starting point. Are other kinds of flowers rare or becoming scarce in your area? A list of New York State plants that should not be picked, that should be picked sparingly, and that may be picked freely, available from the Leaflet Office, Stone Hall, Cornell University, Ithaca, New York, may help you make a list for your area.

When in doubt, make your own rules. One might be: You may pick a few flowers of kinds that are abundant if you (1) leave some flowers to set seed, (2) allow all or most of the leaves to remain on the plant, (3) are careful not to disturb the roots. Another: Pick no flower unless you can reach at least six like it—then pick no more than one. Another: Pick only what you can care for and use. Here is one man's rule:

"Learn, love, and leave for others to enjoy."

2. Know and respect laws and regulations. You may pick what you like on your own land. You are not permitted to pick anything on another person's property without his permission. Picking flowers or in any way injuring any plant is prohibited in many parks. New York State conservation laws protect all wild plants on state lands or on lands under control of the Conservation Department. These laws were discussed in an article, *To Pick or Not to Pick*, in the April-May 1950, *New York State Conservationist*. A reprint is available from the Division of Conservation Education, New York State Conservation Department, Albany 7, New York.

3. Be thoughtful of growing trees and shrubs. Do not break off branches; nor carve initials; nor peel off bark; nor injure them with axes or in other ways. If you need fuel, use dead wood; don't cut living trees, anywhere.

4. When you are in the woods, do everything you can to prevent injurious fire. Remember to keep trash and garbage from parks, fields, woods, roadways, and other places where they do not belong.

5. Conserve yourself. Learn to recognize poisonous plants, especially poison ivy. Some plants,



such as May-apple (every part except the ripe fruit) are poisonous to taste, others to touch.

6. Observe Arbor and Wildlife Day by planning how to conserve a nearby woodland.

7. Learn about the Boy Scout Conservation Good Turn Program. It suggests much that any conservationist can do. Ask about the Boy Scout *Outdoor Code*.

8. Learn to photograph wild plants. *Wild Flowers: How to Enjoy and Identify Them*, listed on page 32, will help.

9. Keep a wild-plant conservation scrapbook.

10. Help others to learn and to practice wild-flower conservation. You and your teachers are accustomed to planning and carrying out such projects. You might try wild-flower exhibits, color-slide shows, bulletin boards, or conservation games (red seals for *no picking*, orange for *caution*, green for *go ahead*). Make and display posters.

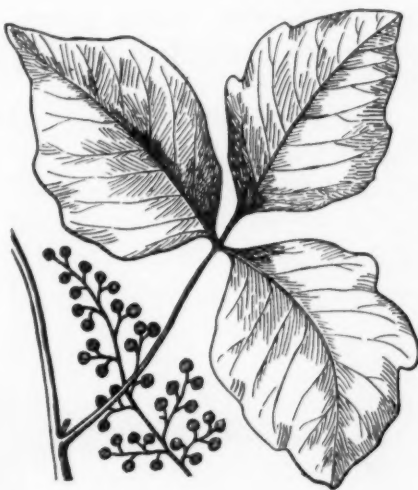
11. Learn about national, state, and local preserves and sanctuaries. You have a part in preserving them. Remember, when you see a flower-decked woodland, to think of it as *your* sanctuary.

12. Some schools have made schoolyard sanctuaries where birds and other animals are fed;

and where wild plants are grown. Remember that wild plants usually require special kinds of soil, amounts of light and moisture, and other conditions. Most do not transplant easily. Do not try to move wild plants unless you can meet their needs. Do not dig wild plants unless you have permission to do so.

*Seedlings of Some Common Trees*  
(See page 14.)

1. Red Maple
2. White Oak
3. American Beech
4. White Pine
5. American Elm
6. Basswood or Linden



*Poison Ivy*

*"Leaflets three, let it be.*

*Berries white, poisonous sight."*

*From Boy Scout Field Book*

## Animals in Spring Woodlands

**T**o watch animals, you must learn how to walk quietly in the woods, or better still, how to sit quietly and use your eyes and ears. Have you ever watched a rabbit "freeze" when it was startled? Can you be as still? You might be surprised to find how many interesting things about animals you could put into a notebook during your spring visits to a woodland.

What mammals do you see? What do they do? Where do you see them—along the borders of the woods, or in the interior?

What about the birds? What new kinds return from the south to join the chickadees, nuthatches, woodpeckers, ruffed grouse, and others that braved the New York winter?

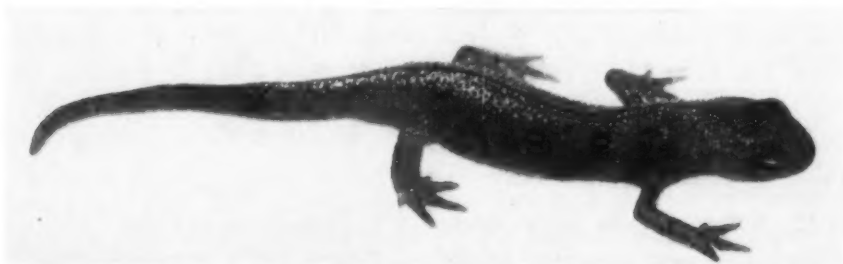
When did you see the first snake? You didn't kill it just because it was a snake, did you? When did the first frogs appear? If there are pools of water in your woodland, we probably should

ask, "When did you *hear* your first frog?" Probably the first frog sounds were the high-pitched, whistle-like notes of the spring peeper, or the duck-like quacking of the handsome wood frog. Have you seen the little red efts, the land stage of the newt? They often crawl about the woodland floor, especially after rains.

Was the first adult insect you saw a honey bee, a ladybird beetle, or a mourning cloak butterfly with dark brown, cream-edged wings, newly emerged from its winter hibernating place? When did you see newly-hatched tent caterpillars? measuring worms?

Have you seen a land snail creep over the leaves, bending its stalked eyes this way and that?

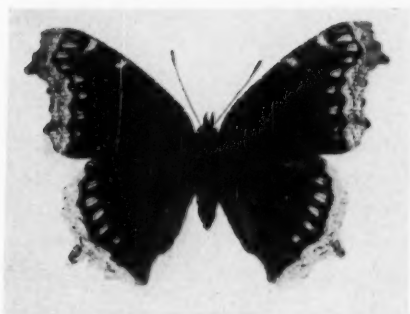
If you are a good conservationist of woodland animals, you will help to keep the woodland a good home for them, and you will allow them to live there undisturbed. Remember, *you* are a guest in *their* home.



*Red Eft, the land stage of the Vermilion-spotted Newt*



*Wood Frog (above)*



*Mourning Cloak Butterfly (right)*

*From Department of Entomology*

## Enjoy, but Do Not Destroy

**Y**ou who read this Leaflet are *Very Important Persons* in the conservation of woodlands: you who visit them or know others who do. You can help greatly to keep wild flowers and other woodland plants from decreasing or disappearing. You can

help, too, to make woodlands good places for birds and other animals to live.

If you are good conservationists, and are willing to show other persons how to help, too, the future of blossom-filled woodlands in spring will be much brighter.

## Useful Books and Other Materials

**L**ISTED below are a few books and other materials useful in studies of woodlands in spring. Many more can be found in libraries. Science textbooks, encyclopedias, and past issues of the Cornell Rural School Leaflets will be helpful also. Books not graded are for older users.

Magazines, newspapers, and publications by state and federal organizations, by museums, and by groups interested in conservation are important sources of material. Examples are *Arbor and Wildlife Day Number* (one each year), Bulletin to the Schools, University of the State of New York, State Edu-

cation Department, Albany, New York; *New York State Conservationist*, Room 417, Arcade Building, Albany 1, New York; *Nature Magazine*, Washington, D. C.; *Canadian Nature*, Toronto, Canada; pictures and other materials, Wildflower Preservation Society, Washington, D. C.

*Conserve Our Soil, Forest, and Wildlife*, Cornell 4-H Club Bulletin 77, 1951, 52 pages; *Know Your Trees*, Cornell 4-H Club Bulletin 43, revised 1948, 80 pages. Mailing Room, Stone Hall, Cornell University, Ithaca, New York.

*A Book of Wild Flowers*. By

Margaret McKenny and Edith F. Johnston. The Macmillan Company, New York City, 1931. 80 pages. Grade 4 and above.

*Flowers, Fruits, Seeds* (1941); *Trees* (1941); *Dependent Plants* (1944); *Saving Our Wildlife* (1944). 36 pages each. All by Bertha M. Parker. Row, Peterson and Company, Evanston, Illinois. Grades 4 to 6.

*Play with Trees*. By Millicent Selam. William Morrow and Company, New York City. 1950. 64 pages. Grades 4 to 6.

*Plants; a Guide to Plant Hobbies*. By Herbert S. Zim. Harcourt, Brace and Company, New York City. 1947. 398 pages.

*Flowers; a Guide to Familiar American Wild Flowers*. By Herbert S. Zim and Alexander C. Martin. Simon and Schuster, New York City. 1950. 157 pages. All ages.

*Wildflowers: How to Identify and Enjoy Them*. By Samuel Gottscho. Pocket Books, Inc., New York City. 1951. 192 pages. All ages.

*American Trees: How to Identify and Enjoy Them*. By Rutherford Platt. Pocket Books, Inc., New York City. 1952. 256 pages. All ages.

*American Wild Flowers*. By Harold M. Moldenke. D. Van Nostrand Company, New York City. 1949. 453 pages.

*Fieldbook of American Wildflowers* (1929, 610 pages); *Fieldbook of American Trees and Shrubs* (1915, 482 pages). Both by F. Schuyler Mathews. G. P. Putnam's Sons, New York City.

*The Fieldbook of Natural History*. By E. Laurence Palmer. McGraw-Hill Book Company, New York City. 1949. 664 pages.

*Guide to Eastern Ferns*. By Edgar T. Wherry. University of Pennsylvania Press, Philadelphia, Pa. 1942. 252 pages.

*Handbook of Nature Study*. By Anna B. Comstock. Comstock Publishing Company, Ithaca, New York. 1939. 937 pages.

*The Macmillan Wild Flower Book*. By Clarence J. Hylander. Illustrated by Edith F. Johnston. The Macmillan Company, New York City. 1954. 480 pages.

*This Green World*. By Rutherford Platt. Dodd, Mead and Company, New York City. 1946. 222 pages.

*Trees of the Eastern United States and Canada*. By William M. Harlow. McGraw-Hill Book Company, New York City. 1942. 288 pages.

*Wild Flower Guide*. By Edgar T. Wherry. Doubleday and Company, Garden City, New York. 1948. 202 pages.

*Wild Flowers of New York*. By Homer D. House. University of the State of New York, State Museum Memoir 15, Albany, New York. 1918. 2 volumes, out of print. *Wild Flowers*, by the same author and with essentially the same content, The Macmillan Company, 1936, 926 pages, also out of print. Portfolio of 265 colored illustrations still available from New York State Museum.